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PAPERS OF THE THIRTY-FIFTH ANNUAL SESSION.

THE PSYCHIC ELEMENT IN HYSTERIA.

M. P. SEXTON, M. D., KANSAS CITY, MO.

In spite of all pedantic efforts to the contrary, it is not likely that the term hysteria will ever become obsolete. For two thousand years it has held its place in the nomenclature of medicine and the morbid conditions which have been described under the title of hysteria are too well understood for the name to be discarded. Moreover the inappropriateness of the term which has been so strenuously asserted is not yet proven in the estimation of many thoughtful practitioners in whose minds ripe experience and scrutinizing analyses have created the belief that there is so often a relation between the generative system and the group of morbid phenomena known as hysteria as to warrant the use of the name. The subtle relation which exists between certain organs of the body and motor impulses through the intermediary connections of the emotional faculties of the mind cannot be ignored in the study of psycho-pathology, and in seeking for the etiological factor in the various forms of hysteria as well as in the certain allied forms of mental alienation it would be folly to overlook those deep springs of human action which exercise such an important influence in all the affairs of life.

Although hysteria is considered a disorder of the mind, there are so many motor and sensory phenomena connected with it that it has seemed to me appropriate to speak of the psychic element in the disease and to briefly call attention to some practical points in connection therewith.

As is clearly enunciated by Berkley, hysteria and neurasthenia have a common pathological basis, namely, an incomplete or faulty development of the higher cortical centers of the brain. But clinically the two diseases are easily differentiated, although the not infrequent blending of the two in the same subject may lead to some confusion and necessitate some care in ascribing a proper degree of responsibility to each for the phenomena observed.

In neurasthenia we have intense emotionality, irritability and incapicity for sustained mental effort, and such a degree of self study and mental depression as to closely simulate true melancholia.

In hysteria emotional influences result in dramatic displays, exceedingly diversified in character, often subconsciously imitating other diseases under the influence of suggestion either from without or from within. The suggestbility of hysteric subjects, although disputed by

those who are interested in hypnotism, is, in my opinion, exceedingly marked and potent for good or evil in every case. It is for this reason that I have always given a rather liberal credence to reports of cures of functional diseases by charlatans, christain science healers, etc. It is my experience that a large proportion of their patrons belong either to the ignorant class or to those possessing a neuropathic taint; and in many instances, of course, they are both ignorant and neuropathic. Take the impressionable temperament of a neuropathic subject and subject it to the positive and unequivocal suggestions of a deliberate fakir or a religious fanatic and fancied ailments are often dissipated, whilst real ones, are, for a time at least, reduced to a minimum by being measurably eliminated from the field of higher consciousness through the subjugating influence of hypnotic suggestion. In this connection it must also be remembered that the term ignorance does not always imply that an individual is uncultured or degraded, but in the sense here used it applies to all those who are not informed as to the general principles or natural laws of health and disease.

The moral sense of a confirmed hysteric patient is greatly impaired and often depraved to a disgusting extent, but he must not be judged too severely for apparently malignering, as such cases are often the unconscious victims of some sort of suggestion and are not really aware that they are trying to deceive, being themselves more deceived than they are deceiving. Nevertheless, the emotions which are over and over given undue rein and the will which is more and more weakened by inactivity and self indulgence, finally become disordered faculties and the logical result is impairment or destruction of the moral sense. Not only is this true, but by the same processes the intellect itself becomes obscured. If this impairment of the mental faculties be but the transitory effect of an acute attack of hysteria, it is proper to look upon it as we would upon the delirium of fever or the intoxication of alcohol or ether. But if the processes outlined above result in the suspension, impairment or destruction of the intellectual, emotional or volitional faculties of the mind to the extent of rendering the individual irresponsible, the patient is insane. The extent of impairment necessary to warrant a diagnosis of irresponsibility or insanity in any given case must be a matter of judgment on the part of the attending physician, and there is no psychosis in which this question is more difficult than it often is in hysteria. I recall the case of a beautiful and refined young woman, who, in her hysterical outbursts, began to manifest homicidal propensities. On one occasion she went so far as to attack her mother with a carving knife and I was called to see her. I advised her incarceration in an

asylum, but the circumstance of my visit and the character of my advice caused her to reflect on the error of her ways, her latent will power was aroused and her subsequent history was satisfactory in every particular. Had she been unable or unwilling to arouse and command her disordered faculties, isolation and confinement would have been necessary, but they might have been ineffectual as restorative measures.

In the development of hysteria as a psychosis there are several causative factors to be reckoned with. Chief of these is heredity in its broader sense. By this I mean both natural and social heredity, natural heredity being an inherited neuropathic constitution, whilst social heredity is that nervous instability which is due to improper associations and environments, unwholesome influences and faulty or pernicious methods of management on the part of parents, guardians or teachers. Natural and social heredity usually act along harmonious lines for the weal or woe of the child, the peculiar characteristic of the one merely accentuating the physiological or pathological trend of the other.

With the lapse of time and the development of the individual the causative factor which we call social heredity becomes broader and more comprehensive until every trinsic influence must be considered and the term environment is used, and even that is scarcely flexible enough to embrace the effects of literature, the stage, religion and all the diversified relations of life which contribute their share in the moulding of characters and the shaping of destinies. But the etiology of hysteria is not confined to the neuropathic constitution, heredity and environment. There are volcanic forces appertaining to the emotional nature which are physiological in character but too often pathological in results, namely, the sexual instinct. Whether this be manifested in the form of romantic dreams and sentimenta reveries or the changing moods of yearnings and desires but little understood by pure-minded youth, or whether it shows itself in thoughts and acts openly prurient, as in those of less refinement and coarser propensities, this instinct is a force which stirs the emotional nature of youth to its profoundest depths. To weigh and measure this force is the plain duty of every physician; to ignore it from a false sense of modesty is silly and prudish. It is also proper to remember that an abnormal irritation due to disease processes is often necessary to evoke morbid phenomena from physiological conditions.

There is no disease in which a wider range of therapeutics will be applied than in the one under consideration. A single case of hysteria will afford the physician opportunity to test the efficacy of his

entire armamentarium. But the administration of drugs is disappointing. It is only by the merest chance that any line of treatment will succeed in these cases which does not embrace a clear comprehension of the principles touched upon in this paper. It is the moral treatment in contra-distinction to the medical which offers a hope of relief. The neuropathic constitution cannot be eliminated, but its characteristics can be developed or repressed by judicious management. Faulty environment can be changed and wholesome influences substituted for unwholesome. The doctrine of self-control can be inculcated and, if necessary enforced. If the proper measures of education and discipline cannot be carried out amid the patient's ordinary environments, a complete change should unhesitatingly be ordered. The real nature of the malady should be candidly revealed to the patient. There is nothing that withers hysteria like the sunlight of truth. The physician should not be afraid of his patient. If he cannot treat the case successfully at home he ought to send the patient to a sanatarium where morbid propensities are intelligently repressed and histrionic displays are received with kindly but cold-blooded disapproval.

DISCUSSION.

Dr. Porter: There is one feature in Dr. Sexton's paper I want to speak of. Recently I had an experience in a case very similar to the one he mentions, just recovering from an attack of croupous pneumonia, where the patient even developed suicidal tendencies, and her people were poorly situated and not able to care for her, and a brother-in-law came and a conversation took place before the patient and he insisted on taking her to an asylum and she began immediately to recover from that time. I believe that possibly it might have degenerated into true insanity had not this threat of sending her to an asylum had an influence over her.

Dr. Punton: Mr. President, I am very much surprised that so many general practitioners allow this paper to go by without discussion for it strikes me that if there is a disease more common than any other it is this disease hysteria. I believe in other words that the psychic element in hysteria is the all important one for the physician in its treatment. I believe as he says that very often we will have as a pathological basis a similar lesion in connection with neurasthenia yet clinically they are easily differentiated. They are not the same disease although their diagnoses agree often interchangeably, yet as a matter of fact there is quite a marked difference between hysteria and neurasthenia. We must recognize in the successful treatment

of hysteria this psychic element, that is to say the moral treatment, which is very largely the treatment of the mind, that is, does not depend upon drugs. In the normal condition of things—we find that the powers of the mind are made up of three great forces, the intellect, the emotion and the will—now in the normal condition of things the will predominates the rest; the will is the ruling force in the mind normally, but in hysteria we find that the will is supplanted by the emotional element so that it becomes subservient, and the feelings of the individual get away with them, and as a result there is a morbid ideation in connection with events and associations in life. The treatment consists then in recognizing this morbid unhealthy ideation of the various things in connection with the case and the treatment consists in suspending that morbid ideation for a healthy ideation, and that is a very difficult thing to do. The first principle, I think, in the treatment is to gain the confidence of the patient, as the doctor expressed, and when you have done that you are then prepared to tell them the truth, and truth cuts like a two-edged sword with hysteria, but it goes farther than drugs, and I believe that this psychic element, recognizing that the underlying factor is an exaltation of the feeling of the individual and a subordination of the will power, is the all important element that we must take into account in regard to the treatment. Now in order to make a successful issue of the case, the surroundings of the individual at home represents two unfortunate conditions, they are irritability or free indulgence, two of the most unfortunate conditions to be met with in the treatment of such cases as hysteria. For that reason I believe that these cases do very much better in a new environment than at home. I believe the general practitioner is up against a worse proposition than anything else when he tries to cure a patient of full grown mature hysteria at their own home. Now I don't say that you can't do it, but I say that the cases that you are successful with at their own homes are few and far between. For that reason I think that every town and every village ought to have its little private hospital in which they can place those cases and give them the benefit of the doubt, but to treat them in their own home is out of the question.

Dr. Boyle: Mr. President and gentlemen, I want to say as Dr. Punton did, I think every general practitioner ought to be interested in this paper of Dr. Sexton's. It is one of the diseases that come into our hands first nearly every time, and anything that I can listen to or hear along this line I am very glad to have the opportunity and I want to say this to you, that my treatment in its various forms as far as curative measures are concerned has been pretty near an absolute

failure. Now I want to say this, gentlemen, with all due respect to Dr. Punton and Dr. Sexton and these men that have their sanitariums, sanitariums do not always cure. Dr. Punton will remember one case; she has been operated on and I don't know what else has been done to her. She is better now. I have been consulted time after time in regard to the matter. Once I sent the patient to Dr. Punton. She was of people who had the means to take care of her. The last account was she was doing nicely. Now there is a form of the disease that I have called hysteria—I don't know any other name to call it, for really gentlemen I haven't the time to trace out the pathology. I read about the neurons and those things, but I haven't the time to trace them up, but I know we have in our section of Kansas some young women and some older women who have what the old ladies call hysterics. In my younger days they had them more than they have now. Those who have these attacks now steer clear of me these latter years. The woman has a quarrel with her husband or some other member of the family; she is dying. You are sent for; you will perhaps give her a hypodermic injection of morphine, and yet she resists. Quite a number of years ago I was called to see a case of that kind. The old lady was having her performance on the bed; they were putting hot cloths about her; she was trying to throw herself off the bed in these periods. I took out my hypodermic syringe and put in about an eighth of a grain. The children were all crying and saying that their mother was dying. I told the children, "Your mother isn't going to die now; she may die sometime, but she isn't going to die now." Now, without asking any questions or anything else I went and gave her the hypodermic injection. By the way, I stood by the bed and some of the attendants said, "Be careful, she is going to go off the bed," but I noticed that when she went to throw herself off the bed she didn't go. In about three minutes it required a large bucket to hold the contents of her stomach, but directly she opened her eyes and recognized me and said, "O, doctor, what will I do?" Said I, "It was necessary to relieve this terrible spasm that you were having." I have never been called a second time to see that woman. I have used it in several other cases with marked success.

Dr. Sexton closed the discussion: Mr. President, I wish merely to accentuate a point or two that I made in the paper. The histrionic display of hysteria and tendency to act and that to act unconsciously or sub-consciously, to lie without trying to deceive, without knowing they are trying to deceive, that should be treated with cold-blooded indifference. That is a thing that can hardly ever be accomplished in domestic circles; this disease lives on sympathy. I wish to speak

of one or two cases to illustrate it. Hysteria is not always a disease of weak and nervous women, but very often it is a disease of apparently robust men. In some of those cases the relationship to the genitive functions is very marked. I had a case come to me, a young minister of splendid physique and very thoroughly developed in every part. This man had been boarding with a widowed lady and her daughter, and he had had paroxysms over and over again, had fallen in a faint and gone through gyrations supposed to be convulsions. He came to me. Shortly after his admission to the sanitarium on returning home one evening I found him in the drug shop with several of the employes gathered around him, he on the floor in an unconscious state in the irregular convulsive movements of the hysteric. A female nurse was chafing his hands. I ordered all the women out of the room and announced that when he had one of the spells that no women should be allowed in the room, no one but the men. Now he didn't know that he wanted the women to come and chafe his hands, but he did. He was a pure minded man; he was unconscious of that element in his case which demanded the sympathetic administrations of a female nurse. Another case, a woman who came to me had been in several sanitariums. She was spoiled bad; she was a woman who had been indulged all her life, had never known what it was to be crossed. She had married a man who was lacking in will power; he was her pliant tool; he was always ready to respond to her suggestions instead of making those powerful suggestions which would be for her benefit. The first day that she arrived at my place, brought by her husband and brother, after she had been in the house awhile I went to her room and sat down and began to talk to her, in the presence of her nurse, an ordinary sensible conversation. She conversed well for a few minutes, and presently her spasm took on a weeping character. Well, you all know what that means; there is no limit to it; the end is hysterical paroxysm. She never had anyone in her life to speak sternly to her until that morning. I turned on her and said, "Stop that noise." She looked like she had been struck; she had been struck in the right spot. I said: "Madam, I give you to understand you can't make such disturbances in this house; it is improper, besides you can't do that here. You have got to behave yourself; you may just as well understand that in the beginning that in this house you have got to behave yourself. Every respect, every kindness will be shown you, but you must behave." She did behave; she was cured; she went home a well woman. It has been now something over a year, but she may have a recurrence at any time. If she had a husband and if she had a family physician who would carry

out that line whenever she has a relapse which she is likely to have she would always be kept in subjection. The family physician was just like the husband; he was afraid of his patient; he was toadying to the patient; he wanted to cure the disease, but at the same time he was too anxious to stand well with his patient and he was too much afraid of losing his relation to that family, as is unfortunately often the case as was mentioned by Dr. Boyle.

THE UNION OF SCIENTIFIC THOUGHT AND CLINICAL PRACTICE.

HENRY SEWALL, PH.D. M.D., DENVER, COLO.

Only a few years have passed since the average practical physician or surgeon was wont to view with a limited tolerance mixed with contempt any serious consideration on the part of his cult of theories attempting to explain vital phenomena. It is true that nearly all important advances in medical art, not to say science, have been founded directly upon the laboratory work of the thinker *per se;* but it is the surest sign of the real advance in medical education recently achieved in this country that now, as never before, the practical clinician regards the laboratory as the culture house for his ideas, and is even prone to inquire into the physics, chemistry, physiology and pathology of the vital phenomena that engage him. It is pleasant also to observe that in this new era Americans are doing their fair share in the development of science. Since more than ever, to-day, our chief advances have their forerunners in laboratory research it seems wise that now and then we should "put our ear to the ground," as the saying is, to anticipate the coming of new hosts of ideas.

I have therefore ventured to present to you, imperfectly and in outline, a theme which during the last five or six years has gained a new significance which is now modifying our conceptions in every field of physiology; which directs the bedside practice of every clinician and which promises in the future to give us such control over vital processes as has hitherto been undreamed of. I shall attempt, at the risk of becoming hopelessly dull and obscure, to touch upon some relations of osmosis and ionic action to the phenomena of health and disease.

As the physical facts and theories at the basis of this subject are more recent than the undergraduate days of most of you, I must ask your indulgence for a few words of definition. Our student days have made us familiar with the classification of substances soluble in water into two groups of colloids and crystalloids, typical examples

of the first group being found in gelatine and the white of egg and of the second in salt and sugar. We remember the familiar demonstration in which a mixture of these substances was inclosed in a tube of parchment paper or of animal membrane which was then immersed in pure water so that the level of the two fluids should allow no difference of hydrostatic pressure. We remember that the salt and sugar would continue to pass out through the membrane into the water until its percentage was equal on the two sides, conversely the pure water would pass into the membranous tube. This process of mixture was called dialysis or diffusion, and the animal or parchment membrane was evidently permeable to the crystalloid though not to the colloid, albumin or gelatine which remained behind in its receptacle. The term osmosis was also applied to this process of diffusion through a membrane, but recently this expression has acquired a very peculiar significance for it has been restricted to indicate those conditions in which a membrane is of such fine texture that it will allow the passage of a water molecule but retains all other molecules, even those of salt and sugar. Cf. Howell. Am. Text-book of Physi. 1900, Vol. I, p. 65, also Waymouth Reid. Schafer's Text-book of Physi. 1898, Vol. I, p. 261. Such a fine sieve is called a "semi-permeable membrane," and may be constructed with nearly theoretical perfection by special technical methods. Suppose we consider a cylinder composed of such a membrane, surrounded by pure water. Pour into the cylinder a 1 per cent water solution of cane sugar until the hydrostatic pressures of the two fluids balance. The pure water begins at once to dyalize through the membrane into the sugar solution, but no sugar passes in the contrary direction. By this means the hydrostatic pressure of the sugar solution increases and continues to increase up to a certain value which is determined by the number of molecules of sugar per volume in solution. This excess of pressure generated within the cylinder containing the sugar solution is known as osmotic pressure. In the case of a 1 per cent. solution of cane sugar the osmotic pressure would equal 0.65 of an atmosphere, or 494 mm.Hg. Did our solution contain 34.21 per cent of sugar (or a number of grammes representing its atomic weight in a litre) the osmotic pressure would reach the enormous value of 22.32 atmospheres. These extraordinary pressures are believed to be due to the molecular energy of the vibrating molecules. The oscillating molecules of pure water pass readily through the membrane in either direction; but the molecules of sugar cannot permeate the membrane and they may be supposed to shield the membrane on their own side from the impact of a certain proportion of water molecules; the resultant

stream is therefore in the direction of the sugar solution. Every substance dissolved in water is capable of exerting a definite osmotic pressure or, to use the old erroneous expression, exerts a definite attracting force on pure water. When two solutions are separated by a semi permeable membrane, water accumulates on the side of the solution having the highest osmotic pressure. When two solutions have the same osmotic pressure neither will lose or gain water and they are said to be isotonic or isosmotic to each other. In other conditions, the solution having the highest osmotic pressure gains water and is said to be hypertonic to the solution which loses water and is therefore hypotonic. Thus, as will be seen later, a 0.7 per cent NaCl. solution is called the "physiological salt solution" because it is supposed to be isotonic or indifferent to the living tissues. As a matter of fact, a little consideration will show that every cell and fluid in the body probably has its specific osmotic pressure with a consequent variation in the concentration of the NaCl. solution isotonic with it. As all osmotic interchanges in the body depend upon the osmotic pressures or tonicities of the interacting substances the determination of these tonicities is a matter of the utmost importance. It may be repeated that the osmotic pressure of a given substance is proportional to the number of molecules per volume of solution. The freezing point of a solution is lowered in proportion to the number of molecules of the dissolved substance per volume; hence the ordinary mode of estimating the osmotic pressures of different solutions is by comparison of their freezing points.

A very important modification of the laws of osmosis is involved if, instead of a substance such as sugar we use as the attracting medium another crystalloid such as common salt. This substance belongs to a chemical group the members of which when in solution conduct an electric current and are decomposed by it, one of the constituents being set free at the positive pole and the other at the negative. They are known as electrolytes and in general may be said to include all salts, bases and acids. It is now a generally accepted theory that when an electrolyte is brought into solution its molecules become dissociated into two or more parts which are known as ions, which are identical with the bodies resulting from the decomposition of the electrolyte by the passage of a galvanic current. The number of molecules which are thus dissociated increases with the dilution, and each ion behaving as an independent molecule the osmotic pressure of such a solution varies not only with the weight of salt dissolved but with the degree of dilution. Take, for example, a molecule of NaCl dissolved in water it becomes dissociated into a Na-ion charged posi-

tively with electricity and a Cl-ion charged negatively. A solution of common salt, consequently, comes to have a new significance as a sodium and chlorine ions whose physical attractions and repulsions for each other and for other substances in solution are determined by their respective electric charges.

The theory of ions, so far from remaining a pure abstraction, has already served as a working hypothesis in much valuable biological research. Observers have agreed that very weak solutions of mineral salts have most important relations to the activities of living matter, and the facts seem to show that these salts act on protoplasm not as compounds, but through their ions. Thus, when a strip of muscle cut out from the apex of the heart is suspended in a weak solution of the chlorides of sodium, potassium, calcium and magnesium, rhythmic contractions are started or brought to the rest, are made stronger or weaker, according as the proportion of one or another of the ingredients of the solution is increased or diminished. (Cf. Howell, American Journ. Physiology, 1898, Vol. II, 47. Lingel idem. 1900, IV, 265. Walden, idem. 1899, III, 123). The automatic contraction of certain marine jelly fishes is similarly modified by the composition of the water in which they move. (Loeb, Am. Jl. Phys. 1900, III, 383). Such effects can only depend upon variation of the metallic ions of the compounds. The physiologist Loeb, of Chicago, has shown reason for believing that the various metallic ions, Na, Ca, K, Mg, etc., form compounds with the proteids of living matter and are individually poisonous to it but that, in proper proportions, they neutralize the harmful influence of one another so that only a helpful, stimulating effect is the result. (Loeb, Am. Jl. Phys. 1900 III, 327). Loeb shows that skeletal muscles contract rhythmically in a pure Na Cl solution, but that the presence of Ca and K-ions prevents such automatism. (Loeb—Reference—Festschrift fur A. Fick, Braunschweig 1899). He has demonstrated that pure Na Cl is deadly to living tissue but that the poisonous effect is counteracted by minute quantities of Ca and K-ions. (Loeb Am. Jl. Phys. 1900, III, 327). Many observations lead to the conclusion that the irritability of muscle and nerve depend upon the presence in them of compounds of proteid with the various ions Na, K and Ca in definite proportion. We have thus far considered the vital relations of the negative or basic ions, called kations, because set free at the negative pole when decomposed by a galvanic current. The positively charged acid ions or anions have also certain physiological relations. Thus Wallace and Cushney of Ann Arbor and others, have found that the rate of absorption of the

salts of the fixed alkalies from the intestine varies with the anion or acid ion. (Wallace & Cushney, Am. Jl. Phys. 1898, I, 411).

As far back as 1864 a chemist, Newlands, found that the chemical and physical properties of the elements had some inherent relation to their atomic weights. He was able to divide all known chemical elements into ten groups between the members of which there was a close resemblance in their chemical properties and a certain chemical relation between their atomic weights. (Brunton, Pharmocology and Therapeutics, 1888, pp. 16-32). Pursuing this idea, Mendlejeff pointed out a vacancy in a series of elements grouped according to the atomic theory and announced that the then unknown element belonging in this place must have certain stated physical and chemical characters. This prediction was later verified by the discovery of the element Gallium.

It has been made certain that a close relation exists between the chemical constitution and the physiological action of drugs, and the effective factor seems to be the atomic weight of the constituent atoms. The physiological activity of certain chemical groups has been found to vary directly and of others inversely as the atomic weights of the reacting elements. Experiment has proved that the physiological effects of certain drugs can be modified in definite ways by addition of chosen radicals to the molecule. Thus the convulsive action strychnine, brucine and thebaine on the spinal cord is changed to a paralyzing effect by the introduction of methyl into the molecule. (Brunton, Phar. and Thera. 1888, pp. 16-32).

Recently Marshall & Heath have shown that the introduction of Cl atoms into certain fatty molecules increases their narcotic and toxic powers. (Marshall & Heath Journ. of Physiology, 1897, XXII, 38). Now the osmotic pressure of any substance in solution has a definite relation to its atomic weight, and it is easy to believe that the new conception of physiological chemistry according to which the chemical or physical activity of electrolytes is referred to those atoms or groups of atoms known as ions discloses a territory whose exploration promises to reveal many secrets of the chemical and physical relations of inorganic to living nature.

Certain kinds of infusorial organisms when exposed to light, or when a galvanic current is passed through the water containing them arrange themselves in definite formation determined by the direction of the current or of the luminous rays. Garrey (Garrey, Am. Jl. Phys. 1900, III, 291,) has recently shown that the attractions and repulsions causing this definite grouping of living organisms, can be completely paralleled by the ionic action of chemical sub-

stances dissolved in the water inhabited by the creatures. The suspicion at once springs up that the rouleau formation of blood corpuscles, the agglutination of bacteria in appropriate media, and the obscure parts of chemotaxis, illustrated by the attraction or repulsion which certain chemical media have for some bacteria and for leucocytes have their explanation in the forces of ionic attraction and repulsion. Strong has recently elaborated a physical theory of nerve and nerve action based on the assumption that the axis cylinder contains negative and positive ions of different degrees of mobility. (Strong. Jour. of Physi. 1900, XXV, 427).

Turning to another phase of the subject, the trophic action of the nerve cell in maintaining the nutrition of the nerve fibre has been explained by assuming that the passage of a nervous impulse so alters the osmotic properties of the axis cylinder as to accelerate the inhibition and assimilation of nutritive material by it. Elizabeth Cooke has shown that the osmotic pressure of fatigued is greater than that of fresh living muscle, and that interchange of material between the muscle fibre and the lymph bathing it is probably thus brought about. (Cooke, Jl. of Physi. 1898, XXIII, 137).

Loeb has drawn attention to the capacity for absorbing water manifested by different soaps. (Loeb, Am. Jl. Phys. 1900, III, 327.) "While K soaps absorb enormous quantities of water the Na soaps absorb much less and the Ca soap still less than the Na soap. If in the Na soaps we substitute K-ions for the Na-ions the soap takes up quantities of water. If we substitute Ca-ions for Na-ions the soap loses water." This author argues that the variable capacity of protoplasm for the absorption of water depends upon the nature of the ions in its proteid molecules. According to him the phenomena of *growth* depend upon the increase of osmotic pressure consequent upon the chemical dissociations resulting from muscular work. (Loeb—Ref.—Archiv. f. d. ges. Physi. 1894, LVI, 567). A wonderful demonstration of the efficacy of osmotic force in modifying vital activity has been furnished by Loeb in his experiments on artificial parthenogenesis. (Loeb, Am. Jl. Phys. 1900, III, 434). It was found that the eggs of a marine animal known as the sea-urchin, which ordinarily develop only after fertilization with spermatozoa, can be stimulated not only to undergo segmentation, but even to develop into complex and normal larvæ by placing them for two hours in sea water made denser by the addition of a certain percentage of chloride of magnesium, after which they are returned to normal sea water. The stimulus to the activity of the protoplasm in this case seems to be the drying due to the loss of water by osmosis. In another direction it

has been shown that the irritability of muscle is, to a certain extent, proportional to the amount of water absorbed by osmotic action.

Let us now transfer some of the principles involved in these necessarily rambling statements to the working of the living body as we commonly regard it. The active tissues of the body contain a very large proportion of water, varying from about 80 per cent in the blood to about 75 per cent in the muscles. Physical continuity between these media is established by the inter-cellular and intra-cellular lymph. Experiment shows, what might have been expected, that the normal distribution of water between blood, lymph and solid tissues is maintained through the nicest physiological adjustment whose direct working factor is probably the force of osmosis. When the blood loses water this is replaced by fluid drawn from the lymph, which in turn makes good its loss from the solid tissues. If a concentrated salt or sugar solution is injected into the vein of a living animal, the osmotic pressure of the blood is thereby increased and a stream of water oozes in through the capillary walls and dilutes the blood. (Starling. Schaefer's Text-Book of Physi. 295). The hydraemic plethora thus produced in some way, possibly through rise of intra-capillary pressure and elevation of filtration force, causes an increased transudation through the capillary walls leading to an augmentation in the force and volume of the lymph current and an increase of activity of renal secretions until the original composition of the blood fluid is regained. When a dilute solution, as of NaCl, having lower osmotic pressure than the blood pressure, is introduced in excess into a vein, the hydraemic plethora thus produced begins at once to diminish owing to the rapid transudation of the fluid through the capillary walls, not of the muscles, but of the intestines and peritoneum. (Sherrington & Copeman, Jl. Phys. XIV, 52). Osmotic interchange between solutions predicates that they are separated by a membrane which is permeable to water but which is not to substances dissolved in it. Now the capillary wall forming the membrane which separates the blood from the lymph, is not a membrane of this character, but allows filtration due to difference of hydrostatic pressure as well as diffusion of substances in solution to pass through it. In the interchange of bodily fluids, therefore, the forces of filtration and diffusion complicate those of osmosis in the transference of material. Moreover, the membrane of separation in the body is a living membrane. The physiological camp is divided in the opinion as to whether the vital attributes of the capillary wall determine the passage of material through it according to principles other than those involved in physical law. Heidenhain and his school maintain

a selecting absorbing and secreting power on the part of the living capillary epithelium aside from the recognized effects of osmotic pressure. Other observers maintain that all transudation finds its basis in the action of the physical forces mentioned. Much may be said on the side of the vitalistic theory of Heidenhain and the abundant nerve supply of the capillaries demonstrated by Sihler, of Cleveland, lends strength to the notion that their walls are in all relations under central nerve control. It has been shown that the capillaries of different vascular districts in the body are differently permeable to their contents. Thus, as determined by the volume of lymph the flow in different situations, the capillaries of different organs may be arranged in a series according to their permeability. The capillaries of the liver, on this scale, show the greatest permeability, those of the muscles the least, with the intestinal vessels manifesting a degree of permeability between them. (Hamilton Jl. of Phys). If we but suppose that the physiological or vital activity of the capillary wall is capable of varying its permeability as a membrane, just as the osmotic pressure of a muscle is modified by its activity, we shall have an explanation of the physiological adjustments of transudation and also of many of the facts of œdema as we know them in medical practice.

From all that has gone before it is evident that the facts of osmosis and the ionic theory have the most intimate relations to the sum total of vital processes. The application of the truths of physiology and of the laws of chemistry and physics to the explanation of clinical phenomena is always to be made with caution, but I will attempt to extract from our familiar experience illustrations of the vital importance of the doctrines of osmosis in medical and surgical practice. The condition of collapse, which is the remote effect to be feared in surgical operations on the abdomen, in hemorrhages and in the course of of diseases such as cholera in which vomiting and diarrhœa are prominent symptoms, depends for its pathology on the abstraction of water from the circulation. In explanation of the necessity of the maintenance of a certain volume of fluid within the blood vessels, I must recall to you the physiological fact that the heart is only the remote cause of the circulation of the blood, the arterial blood pressure is the immediate cause. Cardiac and vaso-motor activities combine to maintain a certain average height of general arterial pressure, for on this depends the nourishment of every living cell in the body. Many active tissues, as the glands, intestines and muscles may vary enormously in their watery contents without abolition of their physiological activity, and a certain loss of fluid from the general circula-

tion can be compensated by more rapid heart beat and increased vascular tone, but the limits of the adjusting mechanism can be easily overstepped. Continued loss of vascular fluid must mean gradual exhaustion of the cardiac and vasa-motor mechanisms in their efforts to maintain a working head of pressure, and with this failure results asthenia of the nervous centers from deprivation of oxygen and other nutriment. At the same time, as will be seen later, concentration of the blood probably leads to clogging of, especially the pulmonary capillaries, by the crowding corpuscles.

Interesting light was thrown on the nature of collapse by experiments conducted by Roy and Cobbett. (Allbutt's System of Medicine III, 326). These observers operated on anesthetized dogs, producing collapse in them by opening the abdominal cavity and ligating the intestines. A continuous record was made of the arterial blood pressure, and the distribution of fluid in the body was determined at short intervals by measuring the specific gravity of the blood and of various tissues. The authors say that "from the time the abdomen was opened the specific gravity of the intestinal wall diminished and that of the skeletal muscles increased very considerably; but the specific gravity of the blood, for an hour or two, did not show any marked change." That is to say, irritation of the abdominal viscera led to an immediate outpouring of watery lymph into the intestinal tissues, due probably chiefly to increased permeability of the capillary walls as well as to increased local capillary pressure. This lymph must have come directly from the circulating blood, and as the blood itself sustained its normal specific gravity it must have derived a compensatory amount of watery fluid from the uninjured tissues, especially the muscle, which accordingly became drier and consequently showed an immediate rise in specific gravity. The supply of lymph in the muscles was thus gradually reduced so that the amount leaking from the blood into the intestinal walls could not be compensated; thereupon the specific gravity of the blood began to rise and though the normal arterial blood pressure was maintained for awhile, signs of circulation failure became manifest. Finally fall of blood pressure began, with increasing specific gravity of the blood, and continued until the death of the animal. Could anything more perfectly portray the continuous osmotic balance determining the distribution of fluid detween tissue and blood throughout the body? Previous to the time of these experiments Hamilton had surmised that drying of the blood by the withdrawal of large quantities of water from it would lead to collapse by clogging the capillaries with corpuscles. (Hamilton, Jl. of Phys). The pinched features of the human victim of collapse find a ready explanation in drying of the tissue of the face by

the drainage of fluid from them. In combatting collapse the familiar practice of the day is the introduction, direct or indirect, of warm salt solution into the circulation. There are few of us who have not marvelled at the almost miraculous return of vital power after such a proceeding. Too often, it is true, after sustaining life day after day with this means we only fail in the end to fan the fading spark into flame. Notwithstanding our often failures, the results already gained are so remarkable that we cannot but be on the right track. It may be that our excess of sodium ions forms, as held by Loeb, actual poison to the tissues, and that their toxicity might be neutralized, as Loeb has shown, by proper admixture of Ca and K-ions. It may be that under the conditions of collapse, the tissues are gradually starved for want of nourishment. Proceeding on this hypothesis and in view of the physiological belief that the sugar of the blood is directly appropriated by the tissues as sources of energy, I have on two occasions added pure dextrose to the saline infusion, once, at least, with apparent good effect. Roy and Cobbett found that intravenous injection of salt solution into their collapsed dogs succeeded only temporarily in reducing the specific gravity of the blood; in a short time it became as high as before. Sherrington & Copeman, (Jl. Phys. XIV, 52,) and Lazarus-Barlow, (Manual of Pathology) have found that strong solutions of glucose, on account of its osmotic properties, maintained a lowered specific gravity of the blood for a much longer time. Many facts of experiment indicate that variations in the specific gravity of the blood give a delicate and speedy response to variations of the circulation both within and without the vascular system, and impress the thought that determination of the specific gravity of the blood should be made as a routine practice in estimating the condition of patients threatened with collapse. After entering upon this subject I was almost overcome with despair at making it seem worth your while to listen to me, but if I have succeeded in impressing the truth that there is one science of physiological-physical-chemistry and that we are in the opening of an era of its practical application to medicine, I am more than content.

DISCUSSION.

Dr. Punton: Mr. President, I don't like the idea of such a valuable paper as this going by without at least a few words of discussion. I think the doctor deserves a great deal of credit for undertaking to bring before us the latest research in physiological chemistry, and bringing before us too, some thoughts which are pregnant so far as they relate to the union of scientific thought to disease. I was very

much interested in what the doctor had to say about the wonderful power of osmosis in its relation to disease, and it seems to me if this line of thought is carefully pursued in our clinical practice that we may arrive at a good many valuable points not only in the treatment but in the diagnosis of diseases. I think the doctor deserves a great deal of credit for coming such a long distance, and giving us the value of his scientific researches.

Dr. Meade: Mr. President, I want to say that this is a paper that is practical, something that everybody will listen to now and not remember. Now the question of chemistry and of physics is a question that the ordinary practitioner dismisses when he goes out to cure people, if you will allow that expression, and he don't keep posted. Of course the practical deductions are universally known, those that he gave here. The first part of it was technical; as he said, it relates to chemistry, which with us has fallen too much into disuse. It is a scientific paper that awakens in us a desire to know the whys and wherefores in our profession, and is worth something to us. But it is something that might be laid away in the archives of science, and nobody would pick it up and read it. It is well worth studying along the lines of science.

Dr. Jewell: Mr. President, I want to differ with the gentleman who just spoke; he says it is something we won't remember. I don't know that I am so different from the others, but I am going to remember it.

Dr. Hunter: Mr. President, I don't intend to discuss this subject, but the question the doctor has brought up is one that has always been of great interest to me. The great difficulty with members of the profession or with the teachers in our medical colleges is the trouble that they put entirely too little stress upon the science of physics and chemistry, and I have often heard it remarked by the practitioner "O, I don't know anything about chemistry, I don't see any use in teaching chemistry in the medical college." There has been in recent years very limited attention paid to these subjects of physics and chemistry. Now the doctor usually knows more chemistry than he thinks he does. But he does not go back to the fundamental principles by the study of which all true progress in scientific research is made. There is where he makes a very great mistake. Now I say that the ordinary practitioner does know something about chemistry. He wouldn't deny that he knew anything about physiology, but what is physiology? It is simply the chemistry and physics of the human body; nothing more or less. That definition will cover the whole subject. Now if he doesn't know the chemistry and physics of the human body, he doesn't know physiology, and to know the chemistry

of the human body, requires physiological chemistry as a matter of course. Every physiological process is a chemical process: bacteriology is a chemical process. Chemistry is the study of the changes which take place in the composition of the bodies. Now all of these physiological processes or changes, either come by physical osmosis, or are changes which take place in the nutrition, and even the changes which take place in the nerve cells, and if we do not get the proper basic idea of them we lose a very large portion of scientific knowledge, that is the proper idea that we should have of these processes, I will tell you it is extremely important, and I want to call your attention to one thing, and that is that some of the greatest discoveries that are being made today have been made by scientists outside of the medical profession, and it is for the very reason that you don't study this pure abstract science enough. As a matter of course our work has to be practical, but in studying pathology you must go outside of the realm of pure science. You take Pasteur and I believe you all acknowledge that through the work of Pasteur came the relation of germ diseases, and it came through his working upon the wine of France: he studied the fermentation, and it was from this fermentation that he first realized the bacteriology as it is used today, and his studies of hydrophobia arose from his studies of fermentation. Now in his studies of hydrophobia, although he had a laboratory, yet Pasteur could not inject that serum because he was not a physician; he took the physicians and they are working in conjunction on the theory of disease, and I could mention a great many cases. Besides Pasteur, there are other persons who are just outside the line of medicine who have contributed very largely to the science of medicine from the outside, and what I want to see is the profession of medicine to be quick to acknowledge that, and quick to take it up. As soon as these discoveries come up they are taken up by the profession, but I very much deplore the tendency which has been in the past, not so much now, to waive tne subject of abstract science as something that is not very practical. It is very practical, extremely practical. I think the doctor has done us a great deal of good, and I hope it will be published and read by many of you. I will not forget it soon.

Dr. McCrea: Mr. President, I have been very much interested in the paper. I think that the class of papers we have had have been a credit to our society, and I was particularly interested in this one, because of the relation of osmosis to the salts which are called electrolytes. We have certain cellular changes which we are not able to explain, yet I have been studying out the question as to how it comes about. In theory with regard to osmosis I think the doctor has ex-

plained the question of chemical change much better than I could, but I believe we are going to make a great deal further progress along that line.

Dr. Punton: Mr. President, during this meeting there has been quite a number of very excellent papers read and discussed, and in the ordinary events they will not be published for the next six months, or a year, in other words until our transactions are published. There are a great many physicians who would like to have an abstract of these papers, something they can look up and think about long before it gets out of their minds. Now I would like to ask the permission of the society to grant me the privilege of publishing extracts which the authors, or the writers are willing to give. I can't see that it will detract from the value of the papers.

The President: It was definitely decided that we have an official organ which will be published monthly; it is left entirely within the power of the committee, so I think those papers will be promptly published.

Dr. Gill: I believe that it has been decided that members who read papers shall present a copy to the officers of the society, but that the authors have the privilege of publishing wherever they please in addition to that; is not that a fact?

The President: It is not a fact except by special motion; these papers become the exclusive property of the society.

Dr. Gill: The society must have a copy, but it does not take from the author the right to have it published somewhere else.

The President: I beg your pardon, it has been done once or twice, but only on special motion.

Dr. Gill: Then I move that the authors of papers, after having left a copy with the stenographer or with the secretary, have the privilege of having their papers published wherever they please. (Motion seconded and carried).

The president declared that inasmuch as the motion was virtually an amendment of a by-law, that he would rule that the motion was not carried, and that it would require a two-thirds vote to carry the same. Whereupon an appeal was taken by Dr. Gill from the decision of the chair, and upon vote the chair was sustained.

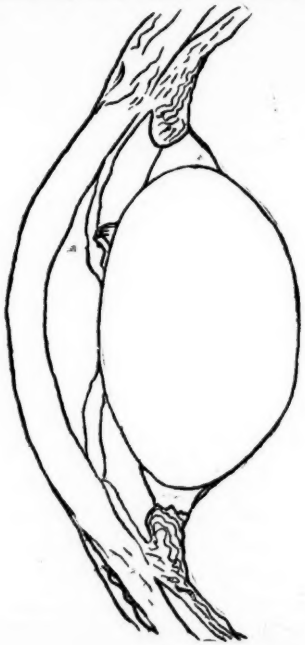
GLAUCOMA OR IRITIS.

A. C. GRAVES, M.D., PITTSBURG, KAN.

The singular coincident of having had four cases lately of internal inflammations of the eye, that could have been improved by timely

treatment, or by different treatment from what they had is my excuse for trying to more clearly elucidate the diagnostic symptom of iritis, and glaucoma, and also to impress the fact if iritis is neglected it may eventuate in glaucoma. I might state another fact in this connection, that if an iritis is neglected it leaves an eye almost beyond assistance. The following two cases will clearly show this point. Mr. B, a young man about 16 years of age, went back on a shot in one of the mines at Galena. The right eye was well peppered with fine particles of rock, particles not as large as the point of a pin. Most of the particles of rock that struck the right eye lodged in the cornea, but some of them reached the lens, producing traumatic iritis and cataract. When he came to me four months after the accident I found the left eye entirely destroyed, the right eye as above described, and as a result of the iritis the pupil entirely occluded and adhered to the anterior capsula of the lens. A mydriatic had no effect in dilating the pupil. The great trouble in this case is adhesion between the iris and anterior capsule, which, if seen in time, could have been prevented by the use of a mydriatic. Case second: Mr. H, seventy-eight, called to have his eyes examined. I found atrophy of the optic nerve of left eye, not able to find the light only in certain parts of the field. In right eye, projection of light good, pupil contracted to a pin point, not able to count fingers, has been blind for two years. Four years ago he was hit on cornea by a chip while chopping wood. I found the lens cataractus. Only about one-half the iris responded to the influence of a mydriatic; the remainder is united to anterior capsule of lens. The lick he received on cornea four years ago unquestionably produced traumatic iritis, which he neglected, and as a result the iris was united to the capsule of the lens. By timely treatment this could have been prevented, but now this eye is the only chance the old man has for vision, and this chance is very much lessened by the union of the iris and capsule. Third case: Mrs. E, called to see me Jan. 1901, suffering greatly with right eye. She stated that she had not been able to sleep for the past two weeks. I found the eye very painful upon pressure; pupil contracted to a pin point. There was a rosy-zone all around the cornea. With this eye she was not able to count fingers. She stated that her eye went out like a flash. I thought this was a mistake as I had vision enough through the small pupil to see that the lens is cataractous, and, judging from the yellow neucleus, had been for some time, and she had not discovered that she was blind in this eye until her attention was called to it by the pain. She was using a few drops of 4 per cent. solution of cocaine about each thirty minutes, as the effect of the drug would wear off in that time. She

was using it to relieve the pain. She was also using an eserine solution. I discontinued these remedies and used a mydriatic in the eye, also gave constitutional treatment. I succeeded in getting a slight dilation but the iris still remained throughout its entire pupilary circle attached to the capsule of the lens. The treatment given relieved the pain at once and in two weeks the soreness elicited on pressure and the redness had disappeared. This was unquestionably a case of iritis. Great damage was done in this case by the use of eserine The pupil is always sluggish in iritis and has a tendency to contraction. The eserine assisted this contraction and held the iris in contact with the anterior capsule of lens, and the inflammatory product of the iritis united the iris to the capsul of the lens, completely checking the flow of fluid through the eye. The secreting surface of the ciliary body furnishes a fluid that nourishes the lens and vitreous. "This fluid finds its way for the most part through the pupil into the anterior chamber and escapes through the filtration angle or, in other words, filters through the legamentum pectinatum into Schlemm's canal and the veins connected with it. A very much smaller quantity finds its way through the vitreous and passes out by the perivascular space in the optic nerve." Since we understand the current of the fluid through the eye, from the ciliary body over the lens, through the pupil and out at the angle formed by the iris and cornea, the cut will help us to understand why I think my third case will end in glaucoma.



You can see the fluid will not be able to find its way into the anterior chamber, on account of the union of iris and anterior capsule, and will bulge the iris forward narrowing the anterior chamber, this will close the angle of filtration and fluids cannot escape. Now if the secretion of fluid still goes on there must of necessity be increased tension.

This patient is 55 years of age, and has a narrow anterior chamber, but I think an iridectomy would prevent eye from going into glaucoma. In these cases of bombe iris, Fuchs of Vienna did transfixion of the iris in 1897 in place of iridectomy. Perforating wounds of the iris do not close, if no iritis is set up. Fourth case: Mrs. F, age 70, complained of having a great pain in right eye at times. She stated that the attack might be brought on by eating and for that reason she would sometimes abstain from eating a whole day; or it might be brought on from touching the cheek. When the pain comes it is so excruciating, radiating from eye all over right side of head and face she is compelled to take morphia sul., to relieve it. Visit was made to office during period without pain. I found pupil dilated, shallow anterior chamber, slight increase of tension. Patient was afraid for me to touch the eye, as I might bring on one of the paroxysms of pain. There was a deep dull redness in ciliary region all around cornea. Vision 20.70, field contracted on nasal side. Ophthalmoscope revealed a slight cupping of optic nerve. She has been growing gradually worse for the past two years. This is a case with all the typical symptoms of primary glaucoma, yet atropine and warm application had been prescribed with the hope of relieving the pain. Atropine will do as much harm in this case as eserine did in previous case of acute iritis. These medicines used in this way will check the current of the fluid through the eye. The eserine by contracting the pupil and holding it in contact with the anterior capsule of the lens, and the inflammatory product of the iris glueing it in its new position. The atropine, by thickening the peripheral of the iris, causes it to overlap the filtration angle, and thus the fluids are retained in the eye. In either case glaucoma will be the result. Now the question, when we have internal inflammation of the eye, before using one or the other of these medicines is, have we glaucoma or iritis? There is but little trouble in deciding between the internal inflammation and conjunctivitis, or external inflammation, as the conjunctiva, when inflamed, has a coarse injection and can be moved over the white shining sclerotic. By gentle pressure the redness can be pressed out, quickly to return when pressure is removed. Not so with the internal inflammation. The rosy-zone that extends all around the cornea is

not affected by pressure, showing that it is the deep ciliary vessels that are congested. Muco-purulent discharge in conjunctivitis; none in the internal inflammation; no disturbance of vision in conjunctivitis, but always in the internal inflammation; pupil unaffected in conjunctivitis, but always as a rule in the internal inflammation. Iris unaffected in color in conjunctivitis, but as a rule always in the internal inflammation. The trouble comes in deciding between the internal inflammations themselvs. In iritis and glaucoma there are a number of symptoms common to both. The iris discolored in both; there may be a tenderness on pressure in both; vision impaired in both; a sluggish pupil in iritis and may have a sluggish pupil in glaucoma. Absence of secretion in both; severe pain in both; pericorneal injection in both, but the great characteristic symptom that distinguishes glaucoma from all diseases of the eye is increased tension. Direct patient to look down and place the index finger of each hand on globe posterior to cornea and make gentle alternate pressure. Then make the same pressure on the fellow eye, and by comparison if there is any increased tension it can easily be detected. There is usually a prodromal stage in glaucoma, which is quite characteristic of the disease.

A sudden failure in vision; the desire to change frequently the reading glass for a stronger one; attacks of foggy vision; the appearance of a rainbow around artificial light. So far I have spoken of glaucoma as an inflammatory disease, yet it is not considered any more of an inflammatory disease than strangulated hernia. There is no particular germ, that produces it, it is essentially a disease of retention. All the symptoms can be directly traced to the pressure, the different structures of eye receives, from the retained secretion. The liability to glaucoma increases with age. This is partly accounted for by the fact, that the lens is the only structure of the body, that continues to grow during the life of the individual. The maximum diameter of the cornea are attained at five years. The globe is fully grown at puberty. We are told that for the forty years from twenty-five to seventy-five that the lens adds one tenth to its diameters, and one-third to its volume. This will partly account for the great danger of using a mydriatic after forty-five years of age. I have always considered cocaine harmless, but I find a case reported in the Annals of Ophthalmology for Jan. 1901 in which a few drops of a two percent solution of cocaine, instilled into the eye of a woman fifty years of age, with 6 D. hypermetropia, produced an attack of acute glaucoma, and as a result an iridectomy had to be done. This writer advises the use of holocane in acute glaucoma a drug with which I am not familiar.

A drug as he states, that has all the pain-relieving qualities of cocaine, but without any danger of further increase of tension, and will also increase the rapidity of action of eserine. This writer advises the use of a one per cent solution of the drug. The danger in a mydriatic so far as I am able to find out, in the aged is in thickening the peripheral attachments of the iris, and causing it to ovealap the angle of filtration, and in this way interferes with the elimination of the fluid through the angle of filtration. The eye ball is a ball of fluid. Rheumatism, gout and syphilis or any constitutional disorder, congenital imperfection, senile changes, by interfering with the circulation and elimination of the fluid will bring on glaucoma. As above stated the diagnosis of glaucoma depends chiefly upon tension the excavation of the disk, and contraction of the fluid. In conclusion I will say it is always safe to use a mydriatic in iritis, and a myotic in glaucoma. Of all the mydriatics I prefer atropine, and of the myotics eserine. Adrenalin is comparatively a new remedy, but I think will prove to be a valuable adjunct to both the above mentioned remedies.

DISCUSSION.

Dr. Gill: Mr. President, recently, and not so recently either, we have come to know some of the disadvantages of cocaine in its effects on the cornea, and this substitute holocane is gaining in reputation constantly before the profession. We have it obtainable now in our city, and it is being used very much in the eye, and in operations upon the nose as a local anaesthetic without having the contracting influence upon the vessels, and that is regarded in some cases as a great advantage over cocaine. Cocaine contracts the vessels, and afterwards they lose their power of contraction, or the condition of contraction and dilating, having lost some of the power. Not so with holocane, it does not act as a contractor of the vessels, and is regarded in some cases as very much preferable to cocaine in that regard. Glaucoma is a question that has attracted the attention of ophthalmologists for years and years, and its cause is not always very clear. We have sometimes a condition brought on by the large and I think unjustified doses of quinine. I have seen some of those cases in our city, large doses of quinine; I think we ought to be careful about that, in which the sight is temporarily at least almost destroyed and may be very permanently injured.

Dr. Jewell: Mr. President, until Dr. Graves was reading his paper, it hadn't occurred to me that there was any special danger of mistaking one of those two cases for the other, so I am very glad that it has been brought up, because the mistakes that are made by some of us general practitioners are sometimes very serious. I remember one

case of plain distinct iritis that was treated for granular lids; there was no granulation in either one of them; it was a plain case of iritis. Now if that can be mistaken, why of course the other might be very readily, and we need to look and think and see, and be careful not to use such treatment as the doctor has found used in those cases, because it is certainly a fact as he states that a mydriatic is an injury every time to glaucoma while the opposite is an injury to the other, and still each is the appropriate treatment.

Dr. Graves closed the discussion: Mr. President, I will simply emphasize the point, the two points made in the paper, and that is, if iritis is neglected, it leaves it almost beyond assistance, and the second point was that if a mistake is made and eserine is used in iritis why it brings on a condition that will result in glaucoma, and if atropine is used in a case where there is a tendency to glaucoma, the case is almost sure to eventuate in glaucoma. Then in either case when we use eserine, or atropine for internal affections of the eye, we ought to be very careful about the diagnosis.

TUBERCULOSIS OF HUMAN BEINGS AND OF CATTLE.—Following the well-known studies of your countryman, Dr. Theobald Smith, Dr. D. A. de Jong, a veterinary surgeon of Leiden, has, since 1899, been pursuing the same line of investigation as that reported by Koch at the British Congress for Tuberculosis, the publication of which has aroused such an extensive discussion. In a few months Dr. de Jong's complete report to the Dutch Minister of the Interior will be published, but I am at this time able to give his very interesting conclusions from his work, which is now practically finished. They are as follows:

1. Tubercle bacilli taken from man can produce tubercular processes in cattle.

2. Human tuberculosis can produce tubercular processes in domestic animals other than cattle (sheep, goats, dogs and also monkeys).

3. The tuberculosis in the above-mentioned animals caused by the tubercle bacillus of human beings is, however, generally less severe than that caused by the tubercle bacillus of cattle.

4. We may therefore conclude that the tubercle bacillus of cattle has in general a greater virulence than the bacillus of human tuberculosis.

5. The increased virulency of the bovine tubercle bacillus as observed in cattle, sheep, goats, dogs and monkeys, will likewise have increased virulency in human beings.

6. Human beings are to be regarded as a less dangerous source of infection to cattle than cattle are for men.

7. Tuberculosis in cattle requires more rigid measures from a hygienic point of view than was formerly thought necessary.

These conclusions, as will be observed, are directly opposed to those of Koch and as they are the results of the labors of an experienced, skillful, prudent and educated investigator, they are of great importance. Koch's opinion on this subject, moreover, is entirely rejected by many learned Dutchmen.—VAN DER HOEVEN, in *Courier of Medicine.*

EDITORIAL NOTES.

THE secretaries of the various sections of the Kansas Medical Society will shortly begin to arrange the program for the next meeting. It is not easy for the secretaries to learn to which section you would prefer to contribute a paper without writing you and it is hardly possible for each of them to write to every member. You may be invited to write a paper for the wrong section but don't feel offended if you do not receive an invitation from the right one. Simply write to the secretary of the section in which you wish to have your paper, giving subject, and it will be appreciated by him. The Secretaries of Sections are as follows:

Surgery, Dr. J. M. Kleizer, Parsons.
Gynecology, Dr. D. K. Longshore, Topeka.
Ophthalmology, Dr. R. S. Magee, Topeka.
General Medicine, Dr. Chas. Gardiner, Emporia.

A LETTER from Dr. Ed. Atkin, Secretary of the Northwest Kansas Medical Association, informs us that that society will probably re-organize and become a district branch of the state society. Their next meeting will be held in December, at Colby.

WE would like very much to have reports from the secretaries of every society in the state. The JOURNAL is published for the purpose of encouraging society work and society extension and the local societies should be interested in it.

WE are informed by Dr. Arbuthnot that a society will be organized in Republic county and will be an auxiliary of the state society.

According to the Marine Hospital Service report, Marion, Ia., is the healthiest town in the United States, having over 1,000 population. It contains over 4,000 people and had but 6 deaths—1.46 per thousand. Carlyle, Ill., is the most unhealthy, with a death rate of 53.21 per thousand. Washington is the most unhealthy of the large cities, with a death rate of 21.71. Of the states North Dakota has the lowest death rate, 6.95 per thousand. Arizona, Colorado and California, of course, have high death rates because of the immigration of consumptives.—Ex.

WHY AND WHEN WE FEEL HUNGRY.—A German physician says we feel hungry when the bloodvessels of the stomach are comparatively empty. Many anæmic patients have no appetite even when the stomach is empty; but the bloodvessels of the stomach are not empty in such cases, but rather congested. In healthy people lack of blood in the stomach acts upon a special nerve and all the characteristic symptoms of hunger follow. Now this hunger nerve and the nerves of the mouth and tongue are branches of the same nerve-trunk. Hence a stimulus applied to the tongue, by a spice for example, creates or increases appetite. On the other hand, when the nerves of the tongue are affected by a diseased condition of the mucous membrane of the mouth, the patient has no appetite, though his stomach may be empty and he may be in actual need of food.—*Modern Med. Science.*

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℞ Strychnin sulfate.....gr. 1-40 | 0015
Monobromated camphor.....gr. 1-2 | 0300
Hyoscyamin.....gr. 1-50 | 0013

For one dose. Repeat according to indications.—*Medical News.*

PERTUSSIS.

℞ Belladonna extract.....gr. j | 060
Alum.....ʒ ss 2 | 000
Glycerin.....
Ginger syrup.....
Tolu syrup.....
Acacia syrup.....aaʒ ij 60 | 000

M. Sig.—Teaspoonful four times a day for a child two years of age.—*Brooklyn Med. Jour.*

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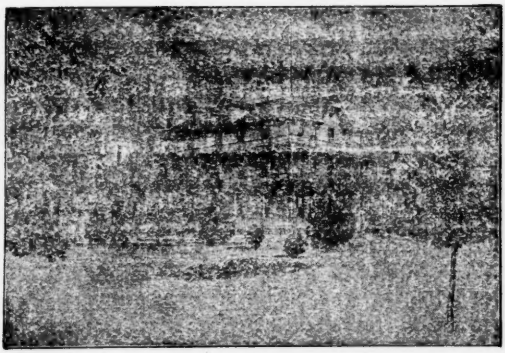

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